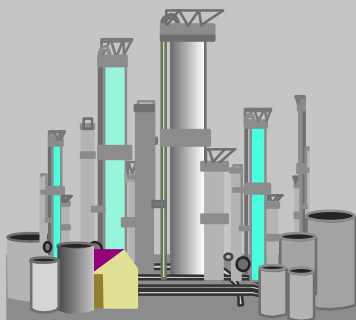


# APPLICATIONS AND USES

**David Burden**, EPA/ORD - *Presenter*



# Application Domains

## Emergency Response

> 20 hurricanes since Emily in 1993 as well as the 1994 Los Angeles earthquake

## Disaster Analysis

Bioterrorism

## Facilities

Energy use tracing/load analysis

## Land Management

"Allowable sales quantity" for Vermont forests

## Defense

Nautical/air/land chart production and tactical applications

## Business and Marketing

Locations for health care facilities

## Natural Resources Management

TMDL compliance

## Government

Zoning and Ownership records



# Environmental Applications

- Groundwater Modeling and Analysis
- Exposure Assessment
- Brownfield Redevelopment
- Emergency Response
- Land and Water Resources
- Integrated Site Characterization
- Field Investigation, Risk Assessment
- Enforcement
- Environmental Justice
- Landscape Ecology
- Critical Habitat Identification
- Sustainable Development



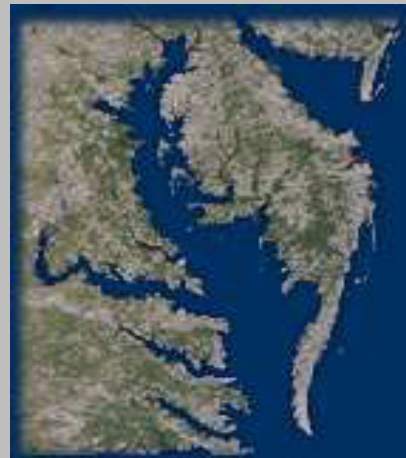
## Center for Exposure Assessment and Modeling

- Groundwater Modeling and Analysis  
e.g. HSPF: Hydrological Simulation Program - Fortran

Surface and subsurface pollutant transport

Watershed hydrology and water quality

Evaluation of landuse change, BMPs, and remedial actions



United States Environmental Protection Agency Region 3

**Chesapeakebay**

- Exposure Assessment

GIS can help in:

Identification of susceptible populations or sensitive sub-populations

Assessment of exposure regime

Analysis of confounding factors

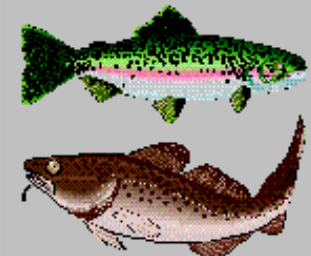
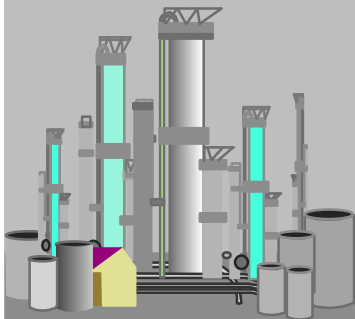
Prediction of risk

Examples:

Children's health protection

Source apportionment

Consumption advisories



- Brownfield Redevelopment

"Abandoned, idled, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination."

*EPA Office of Solid Waste and Emergency Response*



GIS:

Site selection

Site characterization

Development of cleanup strategies



Region 3:  
Philadelphia, PA

Cooperative Efforts



"Success"

- Emergency Response



Chemical Emergency and  
Preparedness Office



National Oceanic and  
Atmospheric Administration

Office of Response  
and Restoration





## Regions 8,9,10



States of North Dakota, South Dakota,  
Montana, Wyoming, Colorado Utah,  
Arizona, Nevada, California, Oregon,  
Idaho and Washington

# WESTERN PILOT

- Land and Water Resources

Coastal waters

Surface waters

Landscapes

Estimate conditions

Identify likely stressors

Build state capacity for long term monitoring

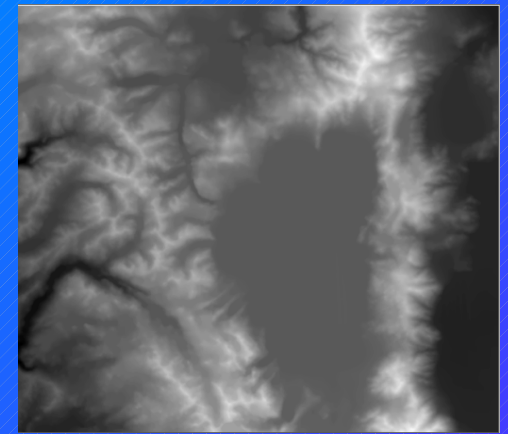




- Integrated Site Characterization  
North American Landscape Characterization (NALC)

USGS, USEPA, NASA cooperative investigation of global change

Determine changes in land cover  
Inventory carbon stocks  
Assess carbon cycling dynamics  
Map sources of greenhouse gases



DEM



1970

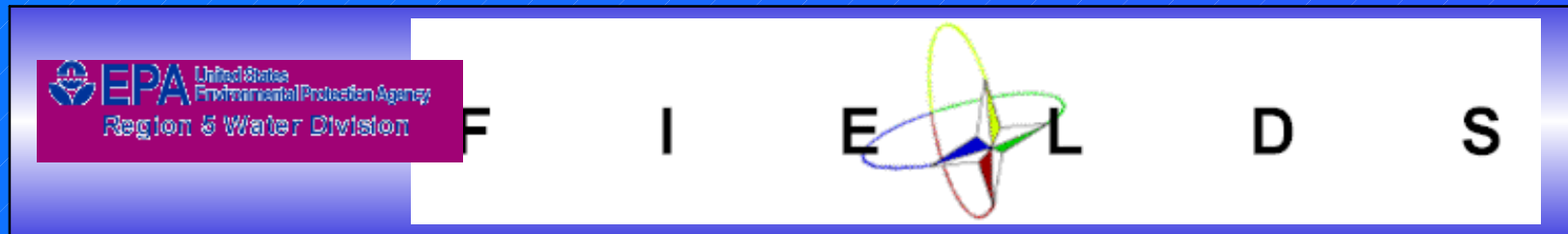


1980



1990

- Field Investigation/ Risk Assessment



FIELDS: Fully Integrated Environmental Location Decision Support

GIS, GPS, Environmental database, website and graphics technology



"Identify sediment, soil, surface water and ground water hot spots and pollutant sources; Assess risks and contaminant mass loadings; Prioritize and target areas; Evaluate remedial alternatives and costs; Effectively visualize and communicate options to decision-makers"

- Enforcement  
Long Island, New York



## Ranking factors

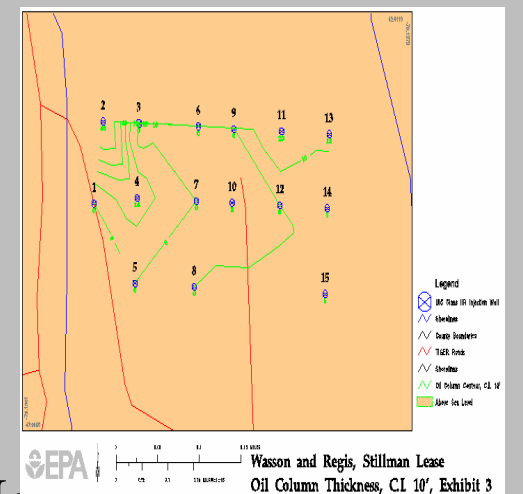
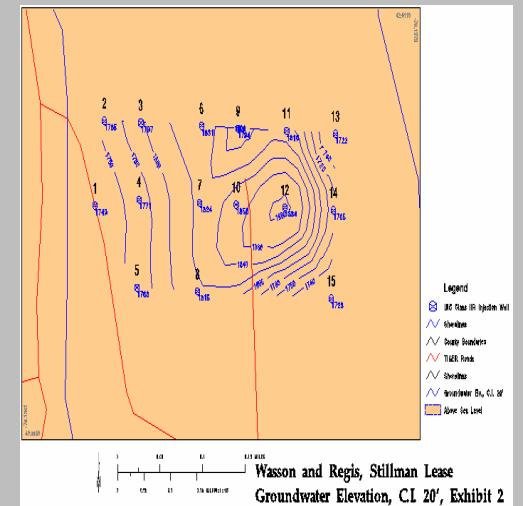
- population dependence on ground water
- potential for contamination
- hydrogeologic vulnerability

## Information Layers

- population density
- age, life style, pre-existing disease
- land use
- percolation travel time
- deep aquifer recharge adjustment factor
- zip codes

## Output

- Underground Injection Control Risk Rank Map





- Environmental Justice

Executive Order 12898 - "equal protection"

Global issue, local enforcement

Cross-media

Multi-agency

Siting and permitting of hazardous waste facilities

Methodologies for cumulative risk assessment

Information collection, warehousing, dissemination



- Landscape Ecology at the Mid-Continent Ecology Division

Determining the effects of forest fragmentation on hydrology, sedimentation, water quality, nutrient transport and biotic community structure and function in streams of the western Lake Superior Basin.

GIS used in:

Site selection

Landscape characterization

Indicator development

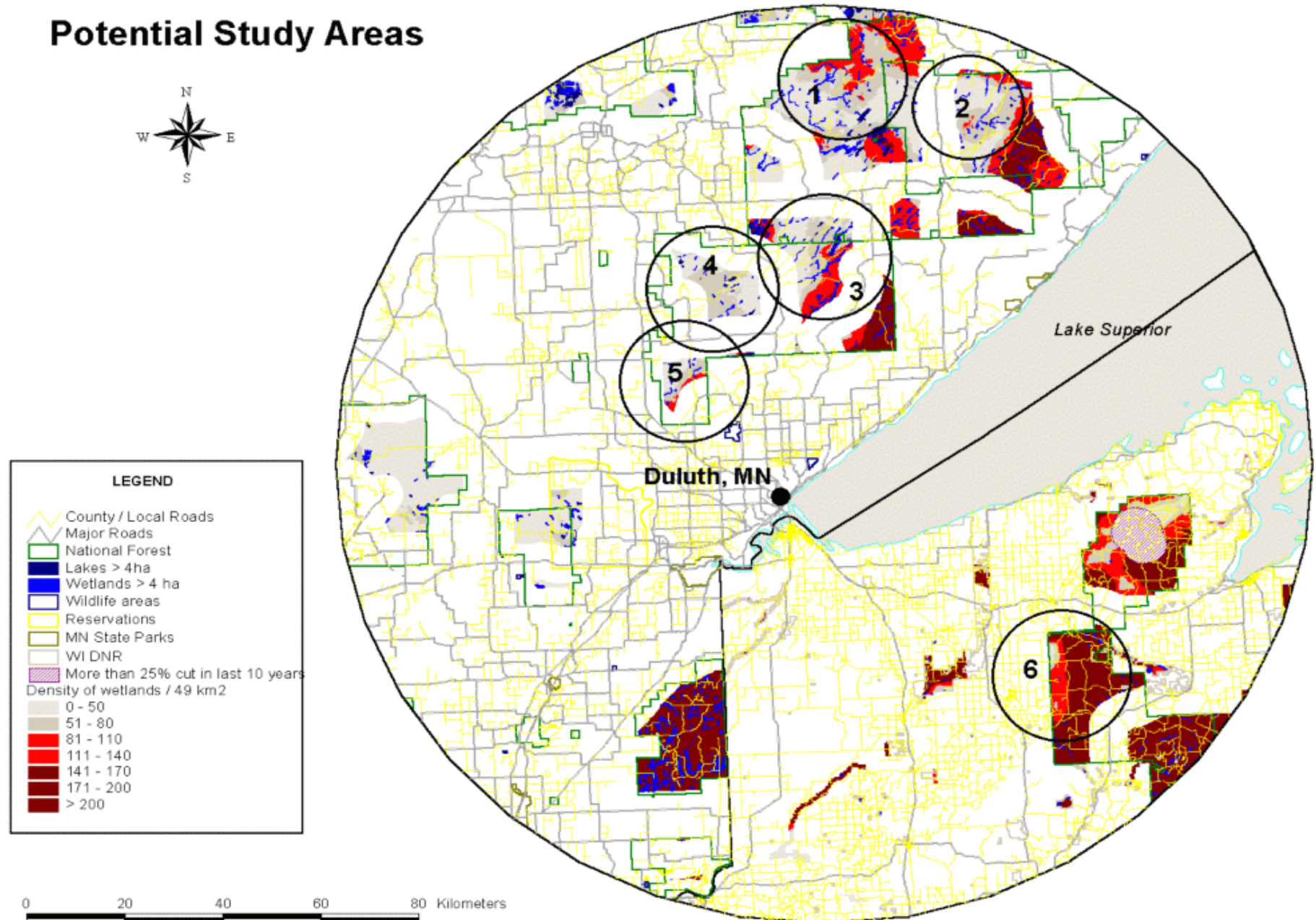
Watershed classification



- Critical Habitat Identification

## Spatial Significance of Amphibian Metapopulations

### Potential Study Areas



- Sustainable Development  
Maintaining and enhancing our quality of life



Region 3

## Center For Sustainability



# Surf Your Watershed

A Service to Help You Locate, Use, and Share  
Environmental Information about Your Place.



<http://www.epa.gov/surf/>



# Envirofacts

Data Warehouse and Applications

*A single point of access to select U.S. EPA environmental data.*



**First Time User**

**Queries, Maps,  
and Reports**

**Technical User**

[http://www.epa.gov/enviro/index\\_java.html](http://www.epa.gov/enviro/index_java.html)